

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2000-044971

(43)Date of publication of application : 15.02.2000

(51)Int.Cl.

C10M105/04
C10M129/72
C10M145/14
C10M169/04
// C10N 20:02
C10N 20:04
C10N 30:02
C10N 40:08

(21)Application number : 10-212334

(71)Applicant : IDEMITSU KOSAN CO LTD

(22)Date of filing : 28.07.1998

(72)Inventor : IGARASHI HIDEO

(54) LUBRICATING OIL COMPOSITION FOR SHOCK ABSORBER

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain a lubricating oil compsn. which is based on a synthetic oil and is excellent in biodegradability by incorporating a lube base oil which comprises a 1-decene dimer and a specific dialkyl ester compd. of adipic or sebacic acid having a specified kinematic viscosity, each in a specified amt., into the same.

SOLUTION: This compsn. contains a lube base oil comprising 80-90 wt.% 1-decene dimer and 10-20 wt.% dialkyl ester compd. of adipic or sebacic acid pref. having a 4-12C alkyl groups and having a kinematic viscosity of 6-13 mm²/s at 40° C. If necessary, the compsn. further contains 10-14 wt.% (based on the total wt. of the compsn.) polymethacrylate-based viscosity index improver having a number average mol.wt. of 30,000-40,000 and may contain a friction modifier, an antioxidant, an ashless detergent-dispersant, a metal deactivator, a defoaming agent, etc. This compsn. is useful as a lubricating oil compsn. for suspension apparatus shock absorbers for automobiles.

LEGAL STATUS

[Date of request for examination]

08.02.2005

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

* NOTICES *

JPO and NCIP are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] (a) The lubricating oil constituent for shock absorbers which comes to contain the base oil which 80 - 90 % of the weight of dimers of 1-decene and the kinematic viscosity in (b)40 degree C become from 10 - 20 % of the weight of dialkyl ester compounds of the adipic acid or sebacic acid which is 6 - 13mm² / s.

[Claim 2] (a) The lubricating oil constituent for shock absorbers which comes to blend the polymethacrylate system viscosity index improver of the (c) number average molecular weight 30,000-40,000 with the base oil which 80 - 90 % of the weight of dimers of 1-decene and the kinematic viscosity in (b)40 degree C become from 10 - 20 % of the weight of dialkyl ester compounds of the adipic acid or sebacic acid which is 6 - 13mm² / s on constituent whole-quantity criteria ten to 14% of the weight.

[Translation done.]

* NOTICES *

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the lubricating oil constituent for shock absorbers excellent in the biodegradability used for the suspension (suspension system) of an automobile especially in more detail about the lubricating oil constituent for shock absorbers.

[0002]

[Description of the Prior Art] The oil-immersed shock absorber of an oil pressure mold is widely used as the shock absorber used in order to absorb vibration effectively, for example, a shock absorber used for the suspension system of a car body, engine means for supporting, the means for supporting of a bumper, etc. in automobile relation. The telescopic structure for which the structure used the flow resistance of oil has been a base. In order to put in the bush which served as guidance in order to prevent mutual wear, and to prevent oil leakage, the seal is carried out to the cylinder and the sliding part of a piston rod. And various kinds of shock absorbers, such as a double pipe mold and a mold containing gas, are known. Also about the lubricating oil used for these shock absorbers, the outstanding biodegradability is demanded for future environmental protection. Biodegradability is not satisfied although the lubricating oil which made mineral oil base oil is used conventionally.

[0003]

[Problem(s) to be Solved by the Invention] This invention was made from the above-mentioned viewpoint, and aims at offering the lubricating oil constituent for shock absorbers which was excellent in biodegradability by making synthetic oil into base oil.

[0004]

[Means for Solving the Problem] this invention person used to complete header this invention for the ability of the purpose of above-mentioned this invention to be attained effectively by mainly using the dimer of 1-decene as synthetic oil, as a result of repeating research wholeheartedly. That is, the summary of this invention is as follows.

(1) Lubricating oil constituent for shock absorbers which comes to contain the base oil which 80 - 90 % of the weight of dimers of (a)1-decene and the kinematic viscosity in (b)40 degree C become from 10 - 20 % of the weight of dialkyl ester compounds of the adipic acid or sebacic acid which is 6 - 13mm² / s.

(2) Lubricating oil constituent for shock absorbers which comes to blend the polymethacrylate system viscosity index improver of the (c) number average molecular weight 30,000-40,000 with the base oil which 80 - 90 % of the weight of dimers of (a)1-decene and the kinematic viscosity in (b)40 degree C become from 10 - 20 % of the weight of dialkyl ester compounds of the adipic acid or sebacic acid which is 6 - 13mm² / s on constituent whole-quantity criteria ten to 14% of the weight.

[0005]

[Embodiment of the Invention] Below, the gestalt of operation of this invention is explained. The mixture which is 10 - 20 % of the weight of dialkyl ester compounds of the adipic acid or sebacic acid 80 - 90 % of the weight of dimers of (a)1-decene and whose kinematic viscosity in (b)40 degree C are 6 - 13mm² / s as base oil of the lubricating oil constituent for shock absorbers of

this invention is used.

[0006] (a) The dimer of 1-decene of a component is a kind of the Pori alpha olefin oil (PAO), and can be prepared by the well-known approach of consisting of the polymerization process of 1-decene, a catalyst decomposition process, a distillation process, and a hydrogenation process. The content of the (a) component in base oil is 80 - 90 % of the weight, and if biodegradability becomes being less than 80 % of the weight with 80% or less and it exceeds 90 % of the weight preferably, it worsens [the aniline point becomes high and / rubber seal-proof nature] and is not desirable.

[0007] (b) Even if two alkyl groups of the dialkyl ester compound of the adipic acid of a component or a sebacic acid have the desirable thing of carbon numbers 4-12 and it is the same, they may differ. Moreover, although a kind or at least two sorts or more of this ester compound can be used, it is necessary to adjust the kinematic viscosity in 40 degrees C to 6-13mm² / s. An evaporation loss increases that they are under 6mm² / s, and it is 2-13mm² preferably. If it exceeds, low-temperature viscosity (BF viscosity) becomes high and is not desirable. A desirable compound is a di(2-ethylhexyl) horse mackerel peat, di(2-ethylhexyl) sebacate, or its mixture. The content of the (b) component in base oil is 10 - 20 % of the weight.

[0008] The additive blended with the above-mentioned base oil is a polymethacrylate system viscosity index improver of the number average molecular weight 30,000-40,000 as a (c) component. In order to have to hold kinematic viscosity [in / that number average molecular weight is less than 30,000 / 20 degrees C] in the fitness range, it is necessary to increase an addition, therefore biodegradability falls. Shear stability falls and is not desirable if 40,000 is exceeded. in addition, this polymethacrylate -- distributed process input output equipment and non-distributed process input output equipment -- either can be used.

[0009] (c) A kind or two sorts or more are sufficient as a component, and the loadings are constituent whole-quantity criteria, and are 10 - 14 % of the weight. If kinematic viscosity [in / that it is less than 10 % of the weight / 20 degrees C] falls and it exceeds 14 % of the weight preferably, since low-temperature viscosity (BF viscosity) will rise, it is not desirable. Desirable loadings are 12 - 14 % of the weight.

[0010] Although the lubricating oil constituent for shock absorbers of this invention is obtained by usually blending the (c) component with the base oil which consists of a (a) component and a (b) component, in order to maintain the fundamental engine performance as a lubricating oil for shock absorbers, it can blend suitably a friction regulator, an antioxidant, an ash-free system detergent dispersant, a metal deactivator, a defoaming agent, etc. in the range which does not check the purpose of this invention.

[0011] As a friction regulator, phosphoric ester, such as alkyl acid phosphate, such as oleyl acid phosphate and lauryl acid phosphate, or an amine salt of those, triphenyl phosphate, and TORIKUREJIRUHOSUETO, or the salt of those is mentioned, and, generally it is used combining alkyl acid phosphate and phosphoric ester, and the loadings are constituent whole-quantity criteria, and are usually 0.1 - 5 % of the weight.

[0012] As an anti-oxidant, a phenol system compound, an amine system compound, a carver mate system compound, etc. are mentioned, and the loadings are constituent whole-quantity criteria, and are usually 0.05 - 2 % of the weight.

[0013] As an ash-free system detergent dispersant, alkenyl succinimid, benzylamine, a polyoxyalkylene amide, a fatty-acid amide, etc. are mentioned, and the loadings are constituent whole-quantity criteria, and are usually 0.1 - 7 % of the weight.

[0014] As a metal deactivator, benzotriazol, thiadiazole, etc. are mentioned, and the loadings are constituent whole-quantity criteria, and are usually 0.005 - 1 % of the weight. As a defoaming agent, dimethylpolysiloxane, polyacrylate, etc. are mentioned, and the loadings are constituent whole-quantity criteria, and are usually 0.0005 - 1 % of the weight.

[0015]

[Example] Next, although an example explains this invention in more detail, this invention is not limited at all by these examples.

The lubricating oil constituent for shock absorbers of this invention was prepared at a rate shown in examples 1-11, and the example of reference 1 1st table. Evaluation of kinematic

viscosity, the aniline point, viscosity, shear stability, biodegradability, and an evaporation loss was performed in the following way about the constituent of these examples. The result is shown in the 1st table.

[0016] [Evaluation criteria]

(1) Kinematic viscosity (mm²/s)

JIS K It is based on 2283 and is the measurement (2) aniline point (degree C) at 20 degrees C, 40 degrees C, and 100 degrees C.

JIS K It is conformity (3) BF viscosity (mPa·s) to 2256.

ASTM It is based on D-2983 and is measurement (4) shear stability (%) at -40 degrees C.

It is based on JPI-5S-29-88, and is measurement (5) biodegradability (%) at 100 degrees C.

It is a conformity (6) evaporation loss (%) to the CEC examining method (CEC-L-33A-93).

The 20mg sample oil was put into the beaker with a diameter [of 50mm], and a height of 50mm, after maintaining it at 120 degrees C in a rotation thermostat for 24 hours, it took out, and it asked for the loss-in-quantity rate of a sample oil by %.

[0017]

[Table 1]

第1表-1

		実施例1	実施例2	実施例3	実施例4	実施例5
配合割合 重量%	1-デセン二量体	73	71	70	70	71
	DOA ^{*1}	10	11	12	13	15
	PMA-A ^{*2}	13	13	12	10	7
	PMA-B ^{*3}	—	1	2	3	3
	PMA-C ^{*4}	—	—	—	—	—
	その他の添加剤 ^{*5}	4	4	4	4	4
動粘度	20℃ mm ² /s	20.79	21.54	22.89	20.99	18.01
	40℃ mm ² /s	11.56	12.02	12.47	11.72	10.02
	100℃ mm ² /s	3.858	4.112	4.128	3.997	3.468
アニリン点 ℃		92	91	90	89	87
BF粘度 mPa·s		700	620	650	550	450
剪断安定性 %		3.4	9.8	11.4	13.9	13.8
生分解性 %		80	80	80	80	82
蒸発減量 %		20>	20>	20>	20>	20>

[0018]

[Table 2]

第1表-2

		実施例6	実施例7	実施例8	実施例9	実施例10
配合割合 重量%	1-デセン二量体	72	74	76	76	71
	DOA*1	10	10	10	10	10
	PMA-A*2	8	6	—	—	15
	PMA-B*3	6	6	—	10	—
	PMA-C*4	—	—	10	—	—
	その他の添加剤*5	4	4	4	4	4
動粘度	20℃ mm ² /s	19.00	20.48	20.18	18.16	24.32
	40℃ mm ² /s	11.32	11.62	12.01	10.51	13.46
	100℃ mm ² /s	4.242	4.112	4.986	3.984	4.389
アニリン点 ℃		92	92	92	94	92
BF粘度 mPa・s		1050	520	450	460	800
剪断安定性 %		19.8	19.8	56.2	36.4	4.8
生分解性 %		80	80	82	82	80
蒸発減量 %		20>	20>	20>	20>	20>

[0019]

[Table 3]

第1表-3

		実施例11	参考例1
配合割合 重量%	1-デセン二量体	68	83
	DOA*1	10	—
	PMA-A*2	18	13
	PMA-B*3	—	—
	PMA-C*4	—	—
	その他の添加剤*5	4	4
動粘度	20℃ mm ² /s	28.27	22.15
	40℃ mm ² /s	15.54	12.05
	100℃ mm ² /s	4.965	4.023
アニリン点 ℃		94	102
BF粘度 mPa・s		900	600
剪断安定性 %		5.1	3.3
生分解性 %		70	70
蒸発減量 %		20>	20>

[0020] (Note)

*1: Di(2-ethylhexyl) horse mackerel peat ([kinematic viscosity of 7mm²/s] in 40 degrees C)

*2: Distributed polymethacrylate (number average molecular weight 35,000)

*3: Distributed polymethacrylate (number average molecular weight 120,000)

*4: Distributed polymethacrylate (number average molecular weight 450,000)

*5: A friction regulator, an antioxidant, an ash-free system detergent dispersant, a metal deactivator, and the 1st table of a defoaming agent show the lubricating oil constituent of an example is not only excellent in biodegradability, but that is equipped with physical properties fundamental as a lubricating oil for shock absorbers.

[0021]

[Effect of the Invention] This invention offers the lubricating oil constituent for shock absorbers which was excellent in biodegradability by making synthetic oil into base oil, and will be able to become practical from the position of environmental protection in the future.

[Translation done.]

*** NOTICES ***

JPO and NCIP are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

TECHNICAL FIELD

[Field of the Invention] This invention relates to the lubricating oil constituent for shock absorbers excellent in the biodegradability used for the suspension (suspension system) of an automobile especially in more detail about the lubricating oil constituent for shock absorbers.

[Translation done.]

* NOTICES *

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

PRIOR ART

[Description of the Prior Art] The oil-immersed shock absorber of an oil pressure mold is widely used as the shock absorber used in order to absorb vibration effectively, for example, a shock absorber used for the suspension system of a car body, engine means for supporting, the means for supporting of a bumper, etc. in automobile relation. The telescopic structure for which the structure used the flow resistance of oil has been a base. In order to put in the bush which served as guidance in order to prevent mutual wear, and to prevent oil leakage, the seal is carried out to the cylinder and the sliding part of a piston rod. And various kinds of shock absorbers, such as a double pipe mold and a mold containing gas, are known. Also about the lubricating oil used for these shock absorbers, the outstanding biodegradability is demanded for future environmental protection. Biodegradability is not satisfied although the lubricating oil which made mineral oil base oil is used conventionally.

[Translation done.]

* NOTICES *

JPO and NCIP are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

EFFECT OF THE INVENTION

[Effect of the Invention] This invention offers the lubricating oil constituent for shock absorbers which was excellent in biodegradability by making synthetic oil into base oil, and will be able to become practical from the position of environmental protection in the future.

[Translation done.]

* NOTICES *

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] This invention was made from the above-mentioned viewpoint, and aims at offering the lubricating oil constituent for shock absorbers which was excellent in biodegradability by making synthetic oil into base oil.

[Translation done.]

* NOTICES *

JPO and NCIP are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.*** shows the word which can not be translated.

3.In the drawings, any words are not translated.

EXAMPLE

[Example] Next, although an example explains this invention in more detail, this invention is not limited at all by these examples.

The lubricating oil constituent for shock absorbers of this invention was prepared at a rate shown in examples 1-11, and the example of reference 1 1st table. Evaluation of kinematic viscosity, the aniline point, BF viscosity, shear stability, biodegradability, and an evaporation loss was performed in the following way about the constituent of these examples. The result is shown in the 1st table.

[0016] [Evaluation criteria]

(1) Kinematic viscosity (mm²/s)

JIS K It is based on 2283 and is the measurement (2) aniline point (degree C) at 20 degrees C, 40 degrees C, and 100 degrees C.

JIS K It is conformity (3) BF viscosity (mPa-s) to 2256.

ASTM It is based on D-2983 and is measurement (4) shear stability (%) at -40 degrees C.

It is based on JPI-5S-29-88, and is measurement (5) biodegradability (%) at 100 degrees C.

It is a conformity (6) evaporation loss (%) to the CEC examining method (CEC-L-33A-93).

The 20mg sample oil was put into the beaker with a diameter [of 50mm], and a height of 50mm, after maintaining it at 120 degrees C in a rotation thermostat for 24 hours, it took out, and it asked for the loss-in-quantity rate of a sample oil by %.

[0017]

[Table 1]

第1表-1

		実施例1	実施例2	実施例3	実施例4	実施例5
配合割合	1-デセン二量体	73	71	70	70	71
	DOA ^{*1}	10	11	12	13	15
	PMA-A ^{*2}	13	13	12	10	7
重量%	PMA-B ^{*3}	—	1	2	3	3
	PMA-C ^{*4}	—	—	—	—	—
	その他の添加剤 ^{*5}	4	4	4	4	4
動粘度	20℃ mm ² /s	20.79	21.54	22.89	20.99	18.01
	40℃ mm ² /s	11.56	12.02	12.47	11.72	10.02
	100℃ mm ² /s	3.858	4.112	4.128	3.997	3.468
アニリン点 ℃		92	91	90	89	87
BF粘度 mPa・s		700	620	650	550	450
剪断安定性 %		3.4	9.8	11.4	13.9	13.8
生分解性 %		80	80	80	80	82
蒸発減量 %		20>	20>	20>	20>	20>

[0018]

[Table 2]

第1表-2

		実施例6	実施例7	実施例8	実施例9	実施例10
配合割合	1-デセン二量体	72	74	76	76	71
	DOA ^{*1}	10	10	10	10	10
	PMA-A ^{*2}	8	6	—	—	15
重量%	PMA-B ^{*3}	6	6	—	10	—
	PMA-C ^{*4}	—	—	10	—	—
	その他の添加剤 ^{*5}	4	4	4	4	4
動粘度	20℃ mm ² /s	19.00	20.48	20.18	18.16	24.32
	40℃ mm ² /s	11.32	11.62	12.01	10.51	13.46
	100℃ mm ² /s	4.242	4.112	4.986	3.984	4.389
アニリン点 ℃		92	92	92	94	92
BF粘度 mPa・s		1050	520	450	460	800
剪断安定性 %		19.8	19.8	56.2	36.4	4.8
生分解性 %		80	80	82	82	80
蒸発減量 %		20>	20>	20>	20>	20>

[0019]

[Table 3]

第1表-3

		実施例11	参考例1
配合割合 重量%	1-デセン二量体	68	83
	DOA*1	10	—
	PMA-A*2	18	13
	PMA-B*3	—	—
	PMA-C*4	—	—
	その他の添加剤*5	4	4
動粘度	20℃ mm ² /s	28.27	22.15
	40℃ mm ² /s	15.54	12.05
	100℃ mm ² /s	4.965	4.023
アニリン点 ℃		94	102
BF粘度 mPa・s		900	600
剪断安定性 %		5.1	3.3
生分解性 %		70	70
蒸発減量 %		20>	20>

[0020] (Note)

*1: Di(2-ethylhexyl) horse mackerel peat ([kinematic viscosity of 7mm² / s] in 40 degrees C)

*2: Distributed polymethacrylate (number average molecular weight 35,000)

*3: Distributed polymethacrylate (number average molecular weight 120,000)

*4: Distributed polymethacrylate (number average molecular weight 450,000)

*5: A friction regulator, an antioxidant, an ash-free system detergent dispersant, a metal deactivator, and the 1st table of a defoaming agent show the lubricating oil constituent of an example is not only excellent in biodegradability, but that is equipped with physical properties fundamental as a lubricating oil for shock absorbers.

[Translation done.]